

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

August 31, 2007

MEMORANDUM FOR: J. Kent Fortenberry, Technical Director
FROM: B. Broderick and C. H. Keilers, Jr.
SUBJECT: Los Alamos Report for Week Ending August 31, 2007

Goff, Minnema, Plaue, and Von Holle were here reviewing corrective actions from accident reviews.

Management: LANL nuclear facility staffing requirements, including staff training and qualification, appear to need more visibility to senior management; it is unclear how these needs are being factored into NNSA and LANL priorities and into performance-based-incentives being negotiated for FY-08. In general, LANL does not appear to have leading indicators of staff populations that may be overtaxed by the extended operations that many facilities are experiencing; such metrics would not only provide advance notice of looming safety problems but also flag future staffing needs. It can easily take a year, and often much longer, to train and qualify staff to work safely in a nuclear facility.

Also, the default solution for many problems is to task the facility operations staff; however, this rarely comes with additional resources. An example may be the corrective actions from the TA-55 and CMR contaminated puncture wounds investigation; these would increase the involvement of operations staff in reviewing, approving, and monitoring work – an appropriate action but one that will be demanding to be done adequately if not sufficiently staffed. Another example may be health and safety staff who face increasing demands to review work planning documents, which decreases their operational awareness and time on the floor monitoring activities that can change frequently.

In the engineering area, staffing is critical to LANL addressing longstanding concerns about operability of safety systems and viability of safety bases controls. LANL has identified that 36 of 43 active vital safety systems have inadequate or marginal engineering coverage and that LANL needs about 41 more engineers in addition to the 52 they now have. Also, at the institution level, LANL would be well-served to track and audit progress on reconstituting the technical baseline for vital safety systems in nuclear facilities, previously estimated to be a \$7.4M effort requiring 3 to 5 years to complete (site rep weeklies 7/27/07, 7/20/07, 6/1/07, 8/4/06).

Criticality Safety: The roughly 20 existing criticality safety evaluations (CSEs) for the TA-55 vault are convoluted, occasionally contradictory, and heavily reliant on expert judgement; these are among about 300 CSEs that LANL has identified as missing, technically deficient, or having some other problem that LANL has committed to address during the next few years (site rep weekly 12/22/06).

The vault CSEs require that two vault rooms have 5% borated-polyethylene in the shelving unit doors, but LANL cannot conclusively assure that the installed material has this level of boration – an ANSI/ANS 8.21 requirement. The poly was intended only as radiation shielding. A 2002 CSE credits the boron, as well as fissile mass, spacing, shape, and reflection; a related 2001 CSE states that boron is required to keep the array sub-critical provided each storage location is loaded to the upper limits; current expert judgement is that boron is not required, but that judgement is not backed by analysis.

Based on photographs, procurement requests, and catalog data, TA-55 has no reason to believe that the configuration is other than the one analyzed; however, there is no material certification, and there are other instances where LANL procurement processes have allowed incorrect materials to be installed. LANL should consider (1) if a criticality infraction exists, in accordance with LANL ISD 130-1; (2) if a sensitivity analyses on boron's effect on safety margin is warranted, including double-batching not covered in the 2002 CSE; and (3) if compensatory measures are needed, as indicated by analysis.